THE OHIO STATE ENGINEER

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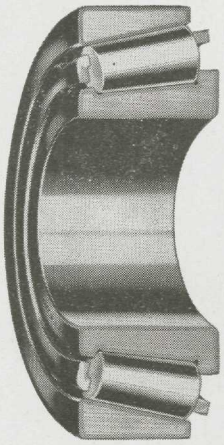
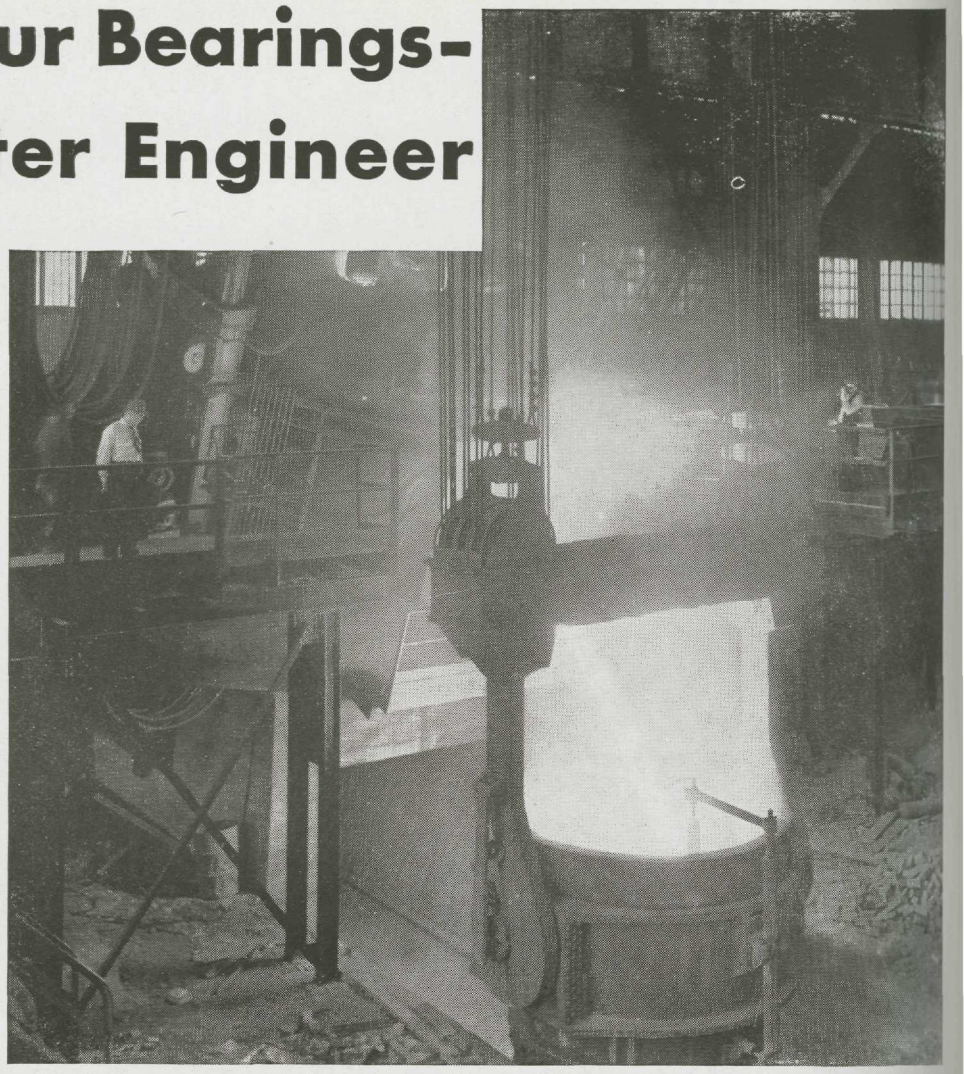
November, 1944

Know Your Bearings-
Be A Better Engineer





Pouring a heat of Timken Electric Furnace Alloy Steel at the Timken steel plant.

What you should know about the Timken Bearing-

MATERIAL—Measure of Endurance

Design, manufacturing precision and material all make important contributions to the outstanding performance of Timken Tapered Roller Bearings. None of these is more valuable than another; each plays its definite part in the attainment of Timken Bearing superiority.

The material used in the production of Timken Bearings is Timken Electric Furnace Alloy Steel manufactured in our own modern steel plant under a rigid system of quality control that assures a consistently superior and uniform product.

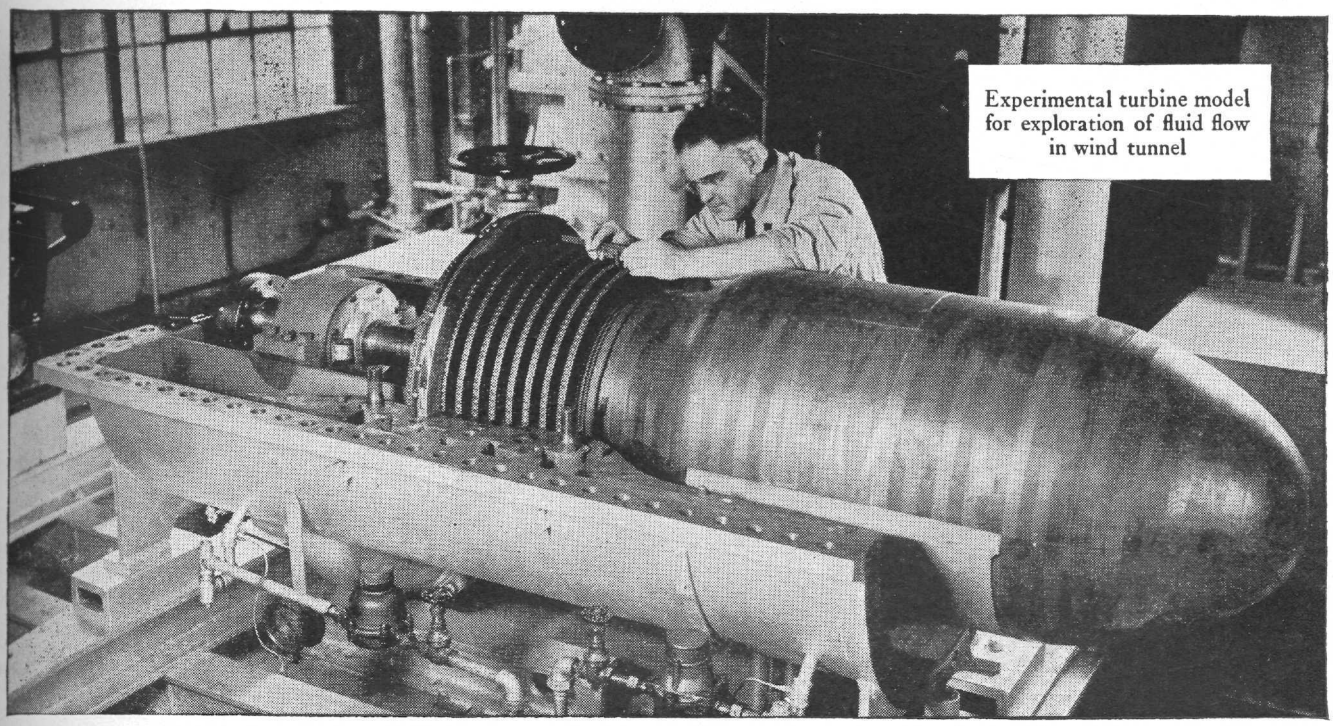
This is a case-carburized steel, having an extremely hard surface that practically defies wear and a tough core that provides the necessary strength through resistance to stress and shock. This combination is a tremendous factor of Timken Bearing endurance and life.

Timken Alloy Steel has achieved an international reputation for quality and now is used for many purposes other than Timken Bearings. It has played a leading role in America's war effort in all kinds of fighting equipment on land, sea and in the air.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

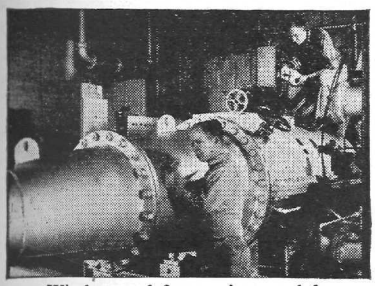
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.



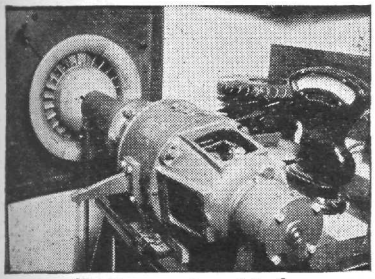
Experimental turbine model for exploration of fluid flow in wind tunnel

OPPORTUNITIES for Creative Junior Engineers to work on research and development of Gas Turbines



Wind tunnel for testing model shown above

Photoelastic study of loaded turbine blade root



Testing wood model of axial flow compressor

Here is an opportunity to get in "on the ground floor" in the new gas turbine industry which promises to revolutionize transportation motive power on land, at sea, and in the air.

Westinghouse needs many graduate engineers with training in engineering mathematics, mechanics, thermodynamics, aerodynamics, metallurgy, or combustion engineering.

Young men with technical training will find an outlet for their creative ability in the research and design of gas turbines and their component parts.

Here are typical activities: Flow research on bladed compressor and turbine structures, diffusers, and nozzle passages—theoretical analysis of gas turbine cycles—study of vibration and stress problems—combustion chamber design and research with all fuels—research and performance testing of the finished product.

Graduate engineers selected by Westinghouse will work in modern laboratories in the Philadelphia area—completely equipped with the finest of research and testing facilities and coordinated with the Westinghouse Research Laboratories at East Pittsburgh, Pa.

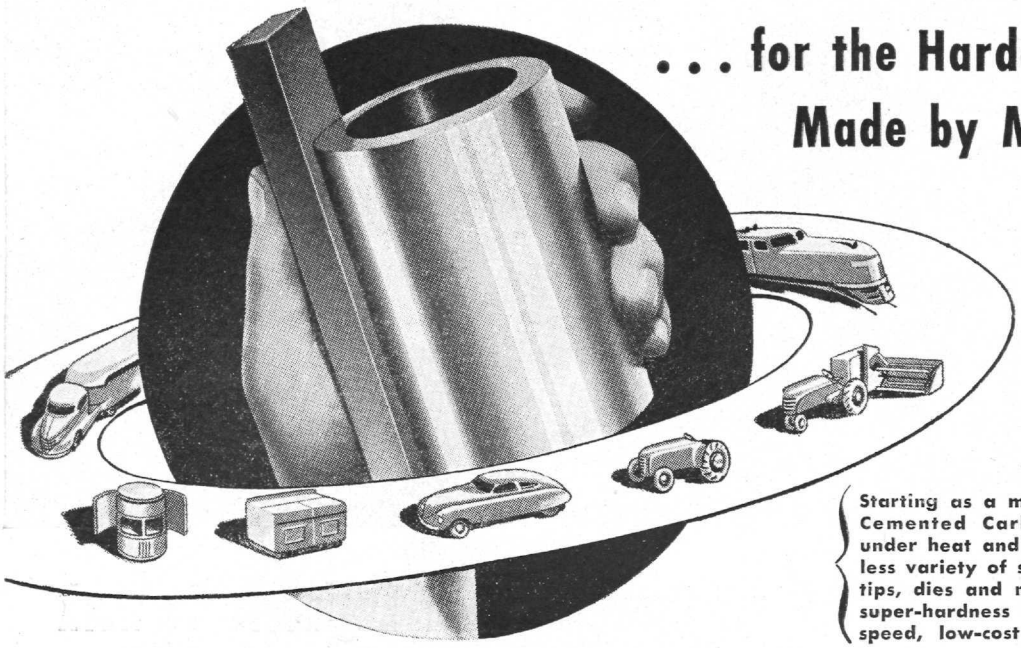
If *you* are interested in associating yourself with the new gas turbine industry, secure a Westinghouse Application Blank from your Dean of Engineering and mail it promptly to: Supervisor, Technical Employment, Westinghouse Electric & Manufacturing Company, 306 Fourth Ave., Pittsburgh 30, Pa.

Westinghouse

Plants in 25 Cities *Offices Everywhere*

A Million Jobs are Waiting

. . . for the Hardest *Metal* Made by Man



Starting as a metal powder, Carboloy Cemented Carbide is transformed, under heat and pressure, into an endless variety of shapes and forms—tool tips, dies and machine parts with the super-hardness that is vital to high-speed, low-cost industrial production.

STRAIGHT through industry, after the war, there will be jobs that only the "hardest metal made by man" can handle.

Why? Because the cry is for better, longer lasting products and parts. Because closer tolerances will be combined with mass production.

And because industry knows that postwar profits will depend largely on the cost at which goods of top quality can be produced in top volume.

Work No Other Known Metal Can Do

Urgent war production needs brought Carboloy Cemented Carbide into its own. Its *super-hardness* was needed in tools to machine *super-tough* alloys — in dies to draw wire and tubing and to form sheet metal.

Carboloy Cemented Carbide works at speeds once thought impossibly high, to tolerances never before practical in mass production—and it commonly doubles or triples the output of machines and men.

It is a matter of war record that the use of this magic metal made possible production of three times the number of aircraft engine crankcases and gears with the same equipment and manpower. And this is only one of many examples.

In peacetime production, it is certain that the usefulness of Carboloy Cemented Carbide will be greatly expanded, in widely varied fields—not only for tools and dies but for "wearproofing" parts that must stand up under modern machine speeds and stresses.

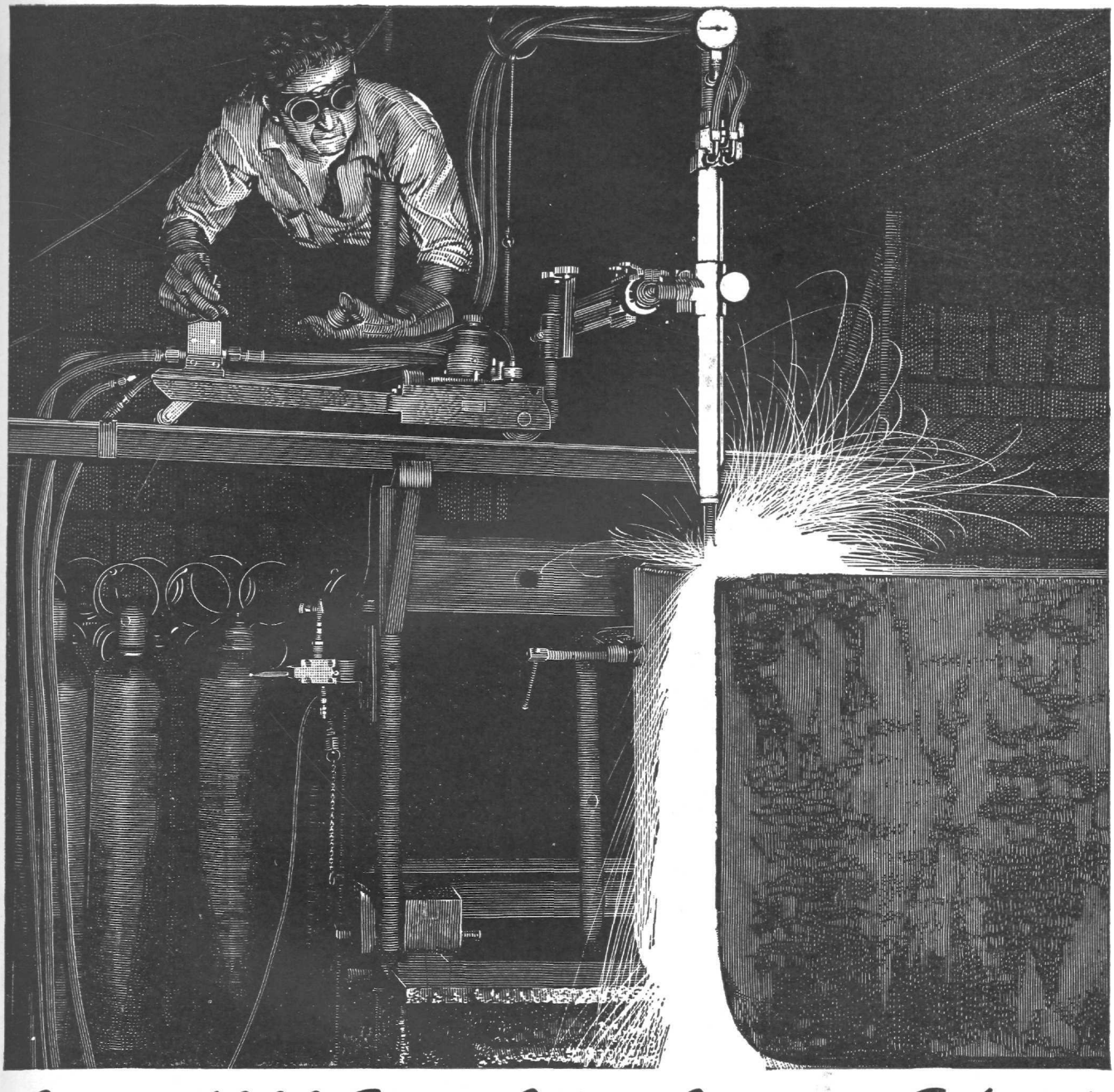
A "Must" in Tomorrow's Competitive Race

The hardest metal made by man may well write the price tags in tomorrow's "battle of costs." You are invited to take full advantage of Carboloy engineering, facilities and experience in planning products for tomorrow.

CARBOLOY COMPANY, INC., DETROIT 32, MICHIGAN

CARBOLOY
TRADE MARK

CEMENTED CARBIDE
THE HARDEST METAL MADE BY MAN



Cutting 1000 Hours Off an Ordnance Schedule

Under the piercing heat of the oxy-acetylene cutting flame, thick metals like this 32" alloy steel block are shaped into parts for heavy weapons faster than ever before.

For example, the flame cutting operation shown here saves more than 1000 hours machining time in producing one heavy part for ordnance use. Similar valuable savings in time and labor are being achieved on hundreds of other war production schedules by this method . . . cutting steel up to 51" thick on a fast, production basis.

Air Reduction engineers have pioneered in the development of many machine flame-cutting methods to speed operations in war and peacetime industry.

If you would like to receive our informative publication "Airco in the News," we shall be glad to send a free copy. Write to Mr. G. Van Alstyne, Dept. C. P., Air Reduction, 60 East 42nd Street, New York 17, N. Y.

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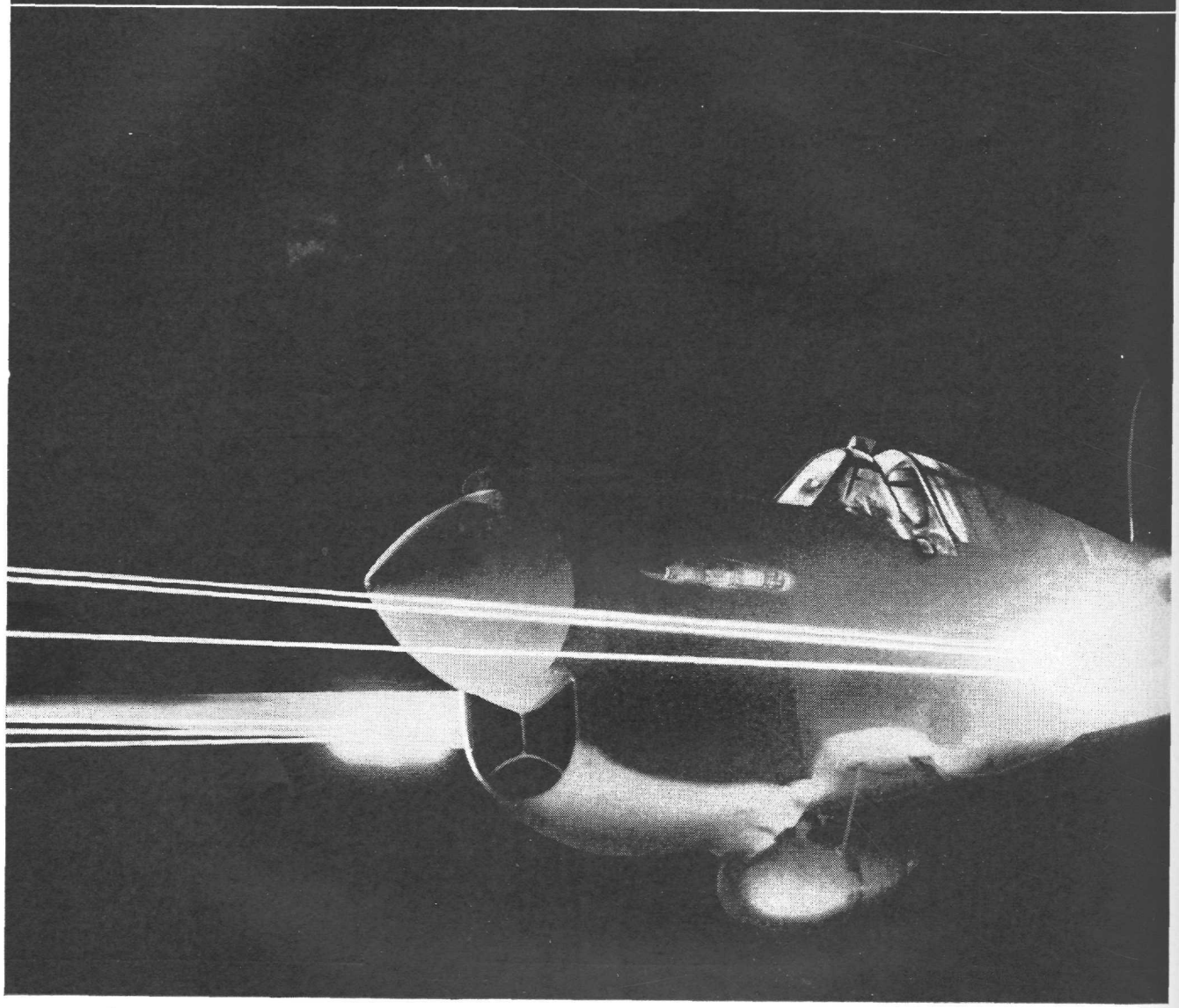
The glass that breaks over Germany...



YOU'VE seen pictures of long range fighter planes with their "belly tanks" that carry extra gasoline. But have you ever wondered how the pilot gets rid of those tanks when they're empty, to decrease weight and gain extra speed and maneuverability?

The big problem in dropping the tank is to sever a tight pipeline connection from tank to plane quickly and positively. This isn't easy with metal, but Corning now makes a fitting from glass tubing that does the trick. The minute the pilot releases the mechanical grips that carry the weight of the tank the glass tubing breaks cleanly and the tank falls free!

War and Corning Research have put glass in a lot of strange places. For instance, there was a time when almost all piping in chemical plants was alloy of one kind or another. Now chemical people have discovered that glass piping is better for many purposes, and Corning has even developed a method for welding it into continuous lengths.

Many of the new uses to which Corning has put glass will persist after the war. For many users have discovered for the first time how really versatile glass is as a material. They are finding out that it has unexpected strengths. That it resists abrasive wear and corrosion. That it is so fatigue proof Corning has even made springs of coiled glass for certain conditions. Perhaps after the war, in whatever business you choose to follow, you will also find that an intelligent application of glass can improve your product or production — Corning Glass Works, Corning, New York.

CORNING
means
Research in Glass

The Ohio State Engineer

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O S E

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Our Cover

Demonstration of protection from lightning by the use of a well-grounded wire "umbrella."

—Courtesy Westinghouse.

Our Frontispiece

Test of paper capacitors in vacuum (at −300° F to +269° F.)

—Courtesy Westinghouse.

YVONNE LAMOREAUX, *Editor* **ROSELLA HORINE, *Bus. Mgr.***

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